IN THE CLAIMS:

A complete listing of all the claims is now presented.

Claim 1. (Cancelled).

Claim 2. (Cancelled).

Claim 3. (Currently Amended).

The method according to ~~claim 2,~~ claim 17, wherein the exchange of the catalysts or the variation of the amount of mass or exchange and variation in the ~~portions~~ sections (d), (g), and (j) ~~are carried out by means of~~ takes place using a numerical random-check generator.

Claim 4. (Withdrawn).

The method according to claim 3, wherein the program codes G05CAF, G05DYF, G05DZF and G05CCF of the NAG Library (NAG FORTRAN Workstation Library, NAG Group Ltd., 1986) of a numerical random-check generator are used.

Claim 5. (Currently Amended).

The method according to ~~claim 2[(a)],~~ claim 17, wherein the ~~quantity~~ number n_1 ~~is in the range of 5 to 100 for catalysts~~

2

~~which are different with regard to~~ <u>varying in</u> their ~~weight~~ <u>quantitative</u> composition or chemical composition or ~~weight~~ <u>quantitative</u> and chemical composition <u>ranges from 5 to 100</u>.

Claim 6. (Currently Amended).

The method according to ~~claim 2,~~ <u>claim 17,</u> wherein the selection number n_2, n_3, or n_{n+1} ~~is~~ <u>measures</u> 5 to 30% of the ~~quantity~~ <u>number</u> n_1.

Claim 7. (Currently Amended).

The method according to ~~claim 2,~~ <u>claim 17,</u> wherein the main components are selected from the group comprised of Mg, Ca, Sr, Ba, Y, La, Ti, Zr, V, Nb, Cr, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, B, Al, Ga, In, C, Si, Sn, Pb, N, P, As, Sb, Bi, S, Se, Te, F, Cl, Ce ~~und~~ <u>and</u> Nd.

Claim 8. (Currently Amended).

The method according to ~~claim 2,~~ <u>claim 17,</u> wherein the mole fractions b_1 .. b_j ~~are~~ <u>range</u> from 0 to 50 mole-%.

Claim 9. (Currently Amended).

The method according to ~~claim 2,~~ <u>Claim 17,</u> wherein ~~the preparation of the~~ catalyst mixtures ~~is carried out~~ <u>are prepared</u> by mixing salt solutions of ~~the~~ elements of ~~the~~ components A^1 ..

3

A^i, B^1 .. B^j, D^1 .. D^k and T^1 .. T^l ~~and subsequent~~ <u>followed by</u> thermal treatment in the presence of a reactive or inert gas phase (tempering) or by ~~common precipitation of~~ <u>jointly precipitating</u> sparingly soluble compounds ~~and subsequent~~ <u>followed by</u> tempering<u>,</u> or by ~~loading of the~~ <u>exposing</u> support component T^1 .. T^l ~~with~~ <u>to</u> salt solutions or gaseous compounds of the components A^1 .. A^i, B^1 .. B^j, D^1 .. D^k ~~and subsequent~~ <u>followed by</u> tempering, wherein the employed salts are nitrates, sulfates, phosphates, carbonates, halogenides, oxalates, carboxylates, or mixtures thereof<u>,</u> or carbonyl compounds or as acetyl acetonates.

Claim 10 (Currently Amended).

The method according to ~~claim 2,~~ <u>claim 17,</u> wherein the catalytic reaction is carried out with liquid, evaporated, or gaseous reactants.

Claim 11. (Currently Amended).

The method according to ~~claim 2,~~ <u>claim 17,</u> ~~characterized in that~~ <u>wherein</u> the reactants for the catalytic reaction ~~is~~ <u>are</u> supplied to several reactors and the product stream exiting the reactors is separately analyzed for each individual reactor.

Claim 12. (Currently Amended).

The method according to claim 11, wherein ~~for performing~~ the

4

catalytic reaction <u>is performed by series-connecting or arraying</u> 5 to 1,000 reactors comprised of spaces with catalytically active material ~~arranged therein are arranged parallel to one another or arranged in arrays,~~ wherein the diameter of these spaces ~~is~~ <u>measures</u> 100 μm to 10 mm<u>,</u> and the lengths ~~are~~ <u>measure</u> 1 mm to 100 mm.

<u>Claim 13. (Currently Amended)</u>.

The method according to claim 11, wherein~~, for a preset reactor length,~~ the throughput of reactants is selected <u>for a preset reactor length in</u> such ~~that~~ <u>a way as to achieve</u> the desired degree of conversion ~~is reached~~.

<u>Claim 14. (Currently Amended)</u>.

The method according to claim 11, wherein <u>the reactor is</u> a monolithic block with several parallel channels, which can be closed selectively at the inlet or outlet side individually or in <u>a</u> larger number ~~also~~ <u>even</u> during the catalytic reaction, or a porous module having channels extending preferably parallel to the flow direction of the reaction mixture<u>,</u> ~~which~~ <u>whose</u> channels can be ~~selectively individually or in large number~~ closed at the inlet or outlet side ~~also~~ <u>individually or in a large number even</u> during the catalytic reaction ~~, is used as the reactor~~.

Claim 15. (Currently Amended.

The method according to ~~claim 16~~ claim 17, wherein the reactants for the catalytic reaction are supplied to the reactors ~~according to claim 11, 12, and 13~~ and wherein the composition of the product streams exiting the reactors is analyzed by a measuring sensor, wherein the measuring sensor is guided two-dimensionally across the exit cross-section of all reactors or the reactors are moved two-dimensionally relative to the measuring sensor and the portion of the product streams received by the measuring sensor is supplied to the analytical device.

Claim 16. (Cancelled).

Claim 17. (New).

A method for preparing active or selective solid catalysts or inorganic or organometallic materials or mixtures thereof by selecting a certain number of solid catalysts varying in terms of chemical composition or different weight composition or different chemical and different weight composition and determining of essential catalyst properties, comprising arbitrarily or randomly newly structuring by means of crossing and mutation, selected among the stochastic methods of random-check generators, throwing dice, and/or performing drawings,

6

a)   a number n_1 of solid catalysts are prepared in the form of compounds of the formula (I)

$$\left(A^1_{a_1}..A^i_{a_i}\right)-\left(B^1_{b_1}..B^j_{b_j}\right)-\left(D^1_{d_1}..D^k_{d_k}\right)-\left(T^1_{t_1}..T^l_{t_l}\right)-O_p \qquad (I)$$

wherein A^1 .. A^i is a number i of different main components which are selected from the elements of the PTE, excluding trans uranium and noble gas elements, and the number i is between 1 and 10,

B^1 .. B^j is a number j of different minor components selected from the group of the elements Li, Na, K, Mg, Ca, Sr, Ba, Y, La, Ti, Zr, V, Nb, Cr, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, B, Al, Ga, In, C, Si, Sn, Pb, N, P, As, Sb, Bi, S, Se, Te, F, Cl, Ce and Nd, and the number j is between 1 and 10,

D^1 .. D^k is a quantity k of different doping elements selected from the

group of the elements Li, Na, K, Mg, Ca, Sr, Ba, Y, La, Ti, Zr, V, Nb, Cr, Mn, Tc, Re, Fe, Ru, Os, Co, Rh, Ir, Ni, Pd, Pt, Cu, Ag, Au, Zn, Cd, Hg, B, Al, Ga, In, Si, Sn, Pb, N, P, As, Sb, Bi, S, Se, Te, F, Cl, Ce and Nd and the number k is between 1 and 10,

T^1 .. T^l is a number l of different support components which are comprised of oxides, carbonates, carbides,

7

nitrides, borides of the elements Mg, Ca, Sr, Ba, La, Zr, Ce, Al, Si or a mixed phase of two or more thereof, and the number 1 is between 1 and 10, and O is oxygen, $a_1 .. a_i$ are identical or different mole fractions of 0 to 100 mole-% with the provision that the mole fractions

$a_1 .. a_i$ cannot all be 0 at the same time,

$b_1 .. b_j$ are mole fractions of 0 to 90 mole-%,

$d_1 .. d_k$ are mole fractions of 0 to 10 mole-%,

$t_1 .. t_1$ are mole fractions of 0 to 99.99 mole-%,

p is a mole fraction of 0 to 75 mole-%, wherein the sum of all mole fractions

$a_i + b_j + d_k + t_1$ may be not greater than 100%, and the number n_1 of catalysts with different quantitative composition or different chemical composition or different weight and chemical compositions is in the range from 5 to 100,000;

b)   the activity or selectivity or activity and selectivity of the 1st generation of n_1 solid catalysts prepared according to (a) of the first generation is determined experimentally for a catalytic reaction in a reactor or in several series connected reactors;

8

c)   a number of 1 - 50 % of the number n_1 of the 1st
     generation of catalysts with the highest activities for
     a specific reaction or highest selectivities for the
     desired product or product mixture of the catalytic
     reaction or activity and selectivity is selected as
     number n_2;

d)   the catalyst components contained in the number n_2 of
     the catalysts with a pre-set probability W, which
     results from the corresponding equations

$$W_A = \frac{1}{i \cdot n_2} \cdot 100\%, W_B = \frac{1}{j \cdot n_2} \cdot 100\%, W_D = \frac{1}{k \cdot n_2} \cdot 100\%, W_T = \frac{1}{l \cdot n_2} \cdot 100\%$$

     for each of the components A^1 .. A^i, B^1 .. B^j, D^1 .. D^k
     and T^1 .. T^l are exchanged between a respective two
     catalysts selected from the number n_2 with a
     probability of $W_{cat} = \frac{1}{n_2} \cdot 100\%$, or that the
     substance amounts a_1 .. a_i, b_1 .. b_j, d_1 .. d_k and t_1 ..
     t_l of the catalyst components A^1 .. A^i, B^1 .. B^j, D^1 ..
     D^k and T^1 .. T^l are varied for some of the catalysts
     selected with a probability of $W_{cat} = \frac{1}{n_2} \cdot 100\%$
     by determining new values for the mole fractions a_1 ..
     a_i, b_1 .. b_j, d_1 .. d_k and t_1 .. t_l within the limits
     defined under (a), or that exchange and variation are
     performed;

9

new catalysts of the general formula (I) A, B, D, T, a, b, d, and t and p as defined under (a) are produced in this way in a number y_2 that forms the 2nd generation of catalysts;

e) the activities or selectivities or activities and selectivities of the 2nd generation y_2 solid catalysts are determined experimentally for the same specific reaction as in (b) in one or more reactors;

f) a number of the 2nd generation n_3 catalysts, having the highest activities for a catalytic reaction or highest selectivities for the desired product and product mixture or activities and selectivities of all 1st and 2nd generation solid catalysts, is selected, wherein the number n_3 is 1 to 50% of the number n_1;

g) the catalyst components contained in the number n_3 of the catalysts with a pre-set probability W, which results from the corresponding equations

$$W_A = \frac{1}{i \cdot n_3} \cdot 100\%, W_B = \frac{1}{j \cdot n_3} \cdot 100\%, W_D = \frac{1}{k \cdot n_3} \cdot 100\%, W_T = \frac{1}{l \cdot n_3} \cdot 100\%$$

for each of the components A^1 .. A^i, B^1 .. B^j, D^1 .. D^k and T^1 .. T^l are exchanged between a respective two

catalysts selected from the number n_3 with a probability of $W_{cat} = \frac{1}{n_3} \cdot 100\%$, or that the substance amount $a_1 \,..\, a_i$, $b_1 \,..\, b_j$, $d_1 \,..\, d_k$ and $t_1 \,..\, t_1$ of the catalyst components $A^1 \,..\, A^i$, $B^1 \,..\, B^j$, $D^1 \,..\, D^k$ and $T^1 \,..\, T^1$ are varied for some of the catalysts selected with a probability of $W_{cat} = \frac{1}{n_3} \cdot 100\%$ by determining new values for the mole fractions $a_1 \,..\, a_i$, $b_1 \,..\, b_j$, $d_1 \,..\, d_k$ and $t_1 \,..\, t_1$ within the limits defined under (a), or exchange and variation are performed;

new catalysts of the general formula (I) with A, B, D, T, a, b, d and t and p as defined under (a) are produced in this way in a number y_3 that forms the 3rd generation catalysts;

h) the activity or selectivity or activity and selectivity of the new 3rd generation y_3 new solid catalysts prepared according to (g) is determined experimentally for the same specific reaction as in (b) in one or more reactors;

i) a number of nth generation n_{n+1} solid catalysts having the highest activities for a catalytic reaction or the highest selectivities for the desired product and

11

product mixture or the highest activity and selectivity of all 1st to n^{th} generation solid catalysts, is selected, wherein the number n_{n+1} is 1 to 50% of the number n_1;

j)   the catalyst components contained in the number n_{n+1} of the catalysts with a pre-set probability W, which results from the corresponding equations

$$W_A = \frac{1}{i \cdot n_{n+1}} \cdot 100\%, \; W_B = \frac{1}{j \cdot n_{n+1}} \cdot 100\%, \; W_D = \frac{1}{k \cdot n_{n+1}} \cdot 100\%, \; W_T = \frac{1}{l \cdot n_{n+1}} \cdot 100\%$$

for each of the components A^1 .. A^i, B^1 .. B^j, D^1 .. D^k and T^1 .. T^1 are exchanged between a respective two catalysts selected from the number n_{n+1} with a probability of $W_{cat} = \frac{1}{n_{n+1}} \cdot 100\%$ or that the substance amount a_1 .. a_i, b_1 .. b_j, d_1 .. d_k and t_1 .. t_1 of the catalysts components A^1 .. A^i, B^1 .. B^j, D^1 .. D^k and T^1 .. T^1 are varied for some of the catalysts selected with a probability of $W_{cat} = \frac{1}{n_{n+1}} \cdot 100\%$ by determining new values for the mole fractions a_1 .. a_i, b_1 .. b_j, d_1 .. d_k and t_1 .. t_1 within the limits defined under (a), or that exchange and variation are performed;

new catalysts of the general formula (I) with the meaning of A, B, D, T, a, b, d and t and p as defined

12

under (a) are produced in this way in a number y_{n+1} that forms the $(n+1)^{th}$ generation catalysts;

k) the activity or selectivity or activity and selectivity is of the y_{n+1} solid $(n+1)^{th}$ generation catalysts prepared according to (g) is determined experimentally for the same specific reaction as in (b) in one or more reactors;

l) selection according to steps (c) + (f) + (i), preparation of a new catalyst generation according to steps (d), (g), (j), and activity/selectivity determination according to steps (e) + (h) + (k) are continued until a catalyst generation is obtained for which the activity or selectivity or activity and selectivity relative to the preceding generations is either not increased, or no longer significantly increased as an arithmetic mean.